PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 1038-12 PCT	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US05/09383	International filing date (*day/month/year*) 22 March 2005 (22.03.2005)	(Earliest) Priority Date (*day/month/year*) 22 March 2004 (22.03.2004)
Applicant RESEARCH FOUNDATION OF THE CITY UNIVERSITY OF NEW		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the Report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed.
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,
   ☐ the text is approved as submitted by the applicant.
   ☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 1a
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/09383

Box IV TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

An optical device (MSM) for sensing an incident optical wave within a wavelength range includes a first array and a second array of electrodes (10) superposed on a substrate (16), and a sensor connected to the contacts. The arrays are interdigitated. Each array includes its own parameters: contact width, contact thickness, groove width, and a groove dielectric constant. A structure assosciated with the arrays resonantly couples the incident wave and a local electromagnetic resonance or hybrid mode including at least a surface plasmon cavity mode (CM). For couplin the CM, an aspaect ration of contact thickness to spacing between electrodes is at least 1. A preferred structure for coupling a hybrid mode for high bandwidth and responsivity incluids a higher dielectric constant in alternating grooves. The substrate may include silicon, including silicon-on-insulator (SOI). Sn SOI device having alternating grooves with a highter dielectric, e.g. silicon oxide, provides .25 A/W and 30 GHz bandwidth.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/09383

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **H01L 31/0224(2006.01);H01L 31/0304(2006.01)**

USPC: 250/214.1,214R;257/184,189,441-444,448,449,457-459
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 250/214.1,214R; 257/184,189,441-444,448,449,457-459

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	US 6,713,832 A (PARDO et al) 30 April 2004 (30.04.2004), see entire document.	1-31
A	US 5,945,720 A (ISHII et al) 31 August 1999 (31.08.1999), see entire document.	1-31

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08 July 2006 (08.07.2006)	31 AUG 2006
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Stephone B. Allen Telephone No. 571-272-2434

Form PCT/ISA/210 (second sheet) (April 2005)

Continuation of B. FIELDS SEARCHED Item 3:
U.S. PTO EAST DATABASES:
search terms: (metal near2 semiconduct$4 near2 metal or metal-semiconduct$4-metal or msm) and electrode and (plasmon near2 wave)